## CLAIMS

We claim:

1. A method for subcarrier selection for a system employing orthogonal frequency division multiple access (OFDMA) comprising:

a subscriber measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station;

the subscriber selecting a set of candidate subcarriers;

the subscriber providing feedback information on the set of candidate subcarriers to the base station; and

the subscriber receiving an indication of subcarriers of the set of subcarriers selected by the base station for use by the subscriber.

2. The method defined in Claim 1 further comprising the subscriber continuously monitoring reception of the pilot symbols known to the base station and measuring signal-plus-interference-to-noise ratio (SINR) of each cluster of subcarriers.

3. The method defined in Claim 2 further comprising the subscriber measuring inter-cell interference, wherein the subscriber selects candidate subcarriers based on the inter-cell interference.

4. The method defined in Claim 3 further comprising the base station selecting subcarriers for the subscriber based on inter-cell interference avoidance.

5. The method defined in Claim 2 further comprising the subscriber measuring intra-cell traffic, wherein the subscriber selects candidate subcarriers based on the intra-cell traffic load balancing.

6. The method defined in Claim 5 further comprising the base station selecting the subcarriers in order to balance intra-cell traffic load on each cluster.

7. The method defined in Claim 1 further comprising the subscriber submitting new feedback information after being allocated the set of subscribers to be allocated a new set of subcarriers and thereafter the subscriber receiving another indication of the new set of subcarriers.

8. The method defined in Claim 1 further comprising the subscriber using information from pilot symbol periods and data periods to measure channel and interference information.

9. The method defined in Claim 8 wherein the subscriber selects candidate subcarriers based on the SINR of a cluster of subcarriers and a difference between measured power corresponding to each cluster during pilot periods and measured power during data periods.

10. The method defined in Claim 9 further comprising the subscriber using the power difference to distinguish, during selection, clusters of subcarriers having substantially similar SINRs.

11. The method defined in Claim 8 further comprising the subscriber using information from pilot symbol periods and data traffic periods to analyze presence of intra-cell traffic load and inter-cell interference.

12. The method defined in Claim 1 wherein the pilot symbols occupy an entire OFDM frequency bandwidth.

13. The method defined in Claim 12 wherein at least one other pilot symbol from a different cell transmitted at the same time as the pilot symbols received from the base station collide with each other.

14. The method defined in Claim 1 further comprising the base station selecting the subcarriers from the set of candidate subcarriers based on additional information available to the base station.

15. The method defined in Claim 14 wherein the additional information comprises traffic load information on each cluster of subcarriers.

16. The method defined in Claim 15 wherein the traffic load information is provided by a data buffer in the base station.

17. The method defined in Claim 1 wherein the indication of subcarriers is received via a downlink control channel.

18. The method defined in Claim 1 wherein the plurality of subcarriers comprises all subcarriers allocable by a base station.

19. The method defined in Claim 1 wherein providing feedback information comprises arbitrarily ordering the set of candidate of subcarriers as clusters of subcarriers.

20. The method defined in Claim 19 wherein arbitrarily order candidate clusters comprise clusters in an order with most desirable candidate clusters being listed first.

21. The method defined in Claim 19 wherein the feedback information includes an index indication of a candidate cluster with its SINR value.

22. The method defined in Claim 21 wherein each index is indicative of a coding and modulation rate.

23. The method defined in Claim 1 wherein providing feedback information comprises sequentially ordering candidate clusters.

24. The method defined in Claim 1 further comprising the subscriber sending an indication of coding and modulation rates that the subscriber desires to employ for each cluster.

25. The method defined in Claim 24 wherein the indication of coding and modulation rates comprises an SINR index indicative of a coding and modulation rate.

26. The method defined in Claim 1 further comprising:

the base station allocating a first portion of the subcarriers to establish a data link between the base station and the subscriber; and then

the base station allocating a second portion of the subcarriers to the subscriber to increase communication bandwidth.

27. The method defined in Claim 26 wherein the base station allocates the second portion after allocating each subscriber in the cell subcarriers to establish a data link between the base station and said each subscriber.

28. The method defined in Claim 26 wherein, due to subscriber priority, the base station allocates the second portion before allocating each subscriber in the cell subcarriers to establish their data link to the base station.

29. An apparatus comprising:

a plurality of subscribers in a first cell to generate feedback information indicating clusters of subcarriers desired for use by the plurality of subscribers; and

a first base station in the first cell, the first base station performing subcarrier allocation for OFDMA to allocate OFDMA subcarriers in clusters to the plurality of subscribers based on inter-cell interference avoidance and intra-cell traffic load balancing in response to the feedback information.

30. An apparatus comprising:

a plurality of subscribers in a first cell to generate feedback information indicating clusters of subcarriers desired for use by the plurality of subscribers; and

a first base station in the first cell, the first base station to allocate OFDMA subcarriers in clusters to the plurality of subscribers;

each of a plurality of subscribers to measure channel and interference information for the plurality of subcarriers based on pilot symbols received from the first base station and at least one of the plurality of subscribers to select a set of candidate subcarriers from the plurality of subcarriers, and the one subscriber to provide feedback information on the set of candidate subcarriers to the base station and to receive an indication of subcarriers from the set of subcarriers selected by the first base station for use by the one subscriber.

31. The apparatus defined in Claim 30 wherein each of the plurality of subscribers continuously monitors reception of the pilot symbols known to the base station and the plurality of subscribers and measures signal-plus-interference-to-noise ratio (SINR) of each cluster of subcarriers.

32. The apparatus defined in Claim 31 wherein each of the plurality of subscribers measures inter-cell interference, wherein the at least one subscriber selects candidate subcarriers based on the inter-cell interference.

33. The apparatus defined in Claim 32 wherein the base station selects subcarriers for the one subscriber based on inter-cell interference avoidance.

34. The apparatus defined in Claim 31 wherein each of the plurality of subscribers measures intra-cell traffic, wherein the at least one subscriber selects candidate subcarriers based on the intra-cell traffic load balancing.

35. The apparatus defined in Claim 34 wherein the base station selects subcarriers in order to balance intra-cell traffic load on each cluster of subcarriers.

36. The apparatus defined in Claim 30 wherein the subscriber submits new feedback information after being allocated the set of subscribers to receive a new set of subcarriers and thereafter receives another indication of the new set of subcarriers.

37. The apparatus defined in Claim 30 wherein the at least one subscriber uses information from pilot symbol periods and data periods to measure channel and interference information.

38. The apparatus defined in Claim 30 wherein the at least one subscriber selects candidate subcarriers based on SINR of the cluster and a difference between measured power corresponding to each cluster during pilot periods and measured power during data periods.

39. The apparatus defined in Claim 38 wherein the one subscriber distinguishes, during selection, cluster of subcarriers having substantially similar SINRs based on the power difference.

40. The apparatus defined in Claim 38 wherein the at least one subscriber uses information from pilot symbol periods and data traffic periods to analyze presence of intra-cell traffic load and inter-cell interference.

41. The apparatus defined in Claim 38 wherein the pilot symbols occupy an entire OFDM frequency bandwidth.

42. The apparatus defined in Claim 41 wherein at least one other pilot symbol from a different cell transmitted at the same time as the pilot symbols received from the base station collide with each other.

43. The apparatus defined in Claim 30 wherein the base station selects the subcarriers from the set of candidate subcarriers based on additional information available to the base station.

44. The apparatus defined in Claim 43 wherein the additional information comprises traffic load information on each cluster of subcarriers.

45. The apparatus defined in Claim 44 wherein the traffic load information is provided by a data buffer in the base station.

46. The apparatus defined in Claim 30 wherein the indication of subcarriers is received via a downlink control channel between the base station and the at least one subscriber.

47. The apparatus defined in Claim 30 wherein the plurality of subcarriers comprises all subcarriers allocable by a base station.

48. The apparatus defined in Claim 30 wherein the plurality of subscribers provide feedback information that comprises an arbitrarily ordered set of candidate subcarriers as clusters of subcarriers.

49. The apparatus defined in Claim 48 wherein arbitrarily order candidate clusters comprise clusters in an order with most desirable candidate clusters being listed first.

50. The apparatus defined in Claim 48 wherein the feedback information includes an index indication of a candidate cluster with it SINR value.

51. The apparatus defined in Claim 50 wherein each index is indicative of a coding and modulation rate.

52. The apparatus defined in Claim 30 wherein providing feedback information comprises sequentially ordering candidate clusters.

53. The apparatus defined in Claim 30 wherein the one subscriber sends an indication of coding and modulation rates that the one subscriber desires to employ.

54. The apparatus defined in Claim 53 wherein the indication of coding and modulation rates comprises an SINR index indicative of a coding and modulation rate.

55. The apparatus defined in Claim 30 wherein the base station allocates a first portion of the subcarriers to establish a data link between the base station and the subscriber; and then allocates a second portion of the subcarriers to the subscriber to increase communication bandwidth.

56. The apparatus defined in Claim 55 wherein the base station allocates the second portion after allocating each subscriber in the cell subcarriers to establish a data link between the base station and said each subscriber.

57. The apparatus defined in Claim 55 wherein, due to subscriber priority, the base station allocates the second portion before allocating each subscriber in the cell subcarriers to establish their data link to the base station.

58. A method comprising:

the base station allocating a first portion of the subcarriers to establish a data link between the base station and the subscriber; and then

the base station allocating a second portion of the subcarriers to the subscriber to increase communication bandwidth.

59. The method defined in Claim 57 wherein the base station allocates the second portion after allocating each subscriber in the cell subcarriers to establish a data link between the base station and said each subscriber.

60. A base station comprising:

means for allocating a first portion of the subcarriers to establish a data link between the base station and the subscriber; and

means for allocating a second portion of the subcarriers to the subscriber to increase communication bandwidth.

61. The apparatus defined in Claim 60 wherein the base station allocates the second portion after allocating each subscriber in the cell subcarriers to establish a data link between the base station and said each subscriber.

62. An apparatus comprising:

a plurality of subscribers in a cell; and

a base station in the cell, the base station to perform subcarrier allocation for OFDMA to allocate OFDMA subcarriers in clusters to the plurality of subscribers based on inter-cell interference avoidance and intra-cell traffic load balancing.